

Possibly the reason that solvent extraction of oils has not made more progress in this country is due to the fact that Cottonseed which is the biggest source of oil does not lend itself particularly to solvent extraction, but with the production of other types of oils it would seem that the development of extraction methods should be given some consideration.

Looking back over the general situation it would seem that 1933 had shown some very marked developments in fat and oil research, especially from the standpoint of improvements in qualities of oils, and particularly towards the improvement of their stability, and the hope that 1934 will see much further developments along these lines.

Some Results That Have Been Obtained by Supplementing the Dietary With Cod Liver Oil

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ACCORDING to Guy¹⁰, liver oils have been used in medicine for something over 1,800 years. Until very recently the information concerning the efficacy of liver oils for treating various human diseases, such as chronic rheumatism, scrofula, and rickets, was based largely on empirical observations. Since the discovery of vitamins it has been very definitely shown that cod liver oil is an exceedingly rich source of Vitamin A and Vitamin D. In other words cod liver oil has an energy value equal to that of the common edible fats and oils and in addition has a vitamin content not possessed by the generally used edible fats and oils. As a consequence of this observation numerous investigations have been conducted to obtain data concerning the source of the vitamins contained in cod liver oil and the influence of various manufacturing procedures, storage conditions, etc., on their permanency in cod liver oil. Obviously a question soon arose as to the practical results which could be expected from the administration of vitamin rich cod liver oil as a supplement to diets which were more or less inadequate with respect to the fat-soluble vitamins present in cod liver oil. The investigations which will be discussed below were undertaken to collect data concerning the influence of cod liver oil on reproduction, concerning its value as a dietary supplement for underpar children of school age and concerning its value for reducing certain types of absenteeism amongst industrial employees.

The study¹¹ of the possible influence of cod liver oil on reproduction was conducted with young mature Rhode Island Red pullets. Five pens of seventy-five eight-months-old birds were housed and fed under comparable conditions for a period of eight months. The birds of Pen 1 received no cod liver oil and thus served as controls. The birds of Pens 2, 3, 4 and 5, received, daily, ¼ cc, ½cc, 1 cc and 2 cc respectively, of vitamin

rich cod liver oil. During the experimental period data was collected concerning the mortality and the body weight of the experimental birds, the egg production, the number of eggs containing blood spots, the weight of eggs, the fertility and hatchability of the eggs, and the viability of chicks obtained from the eggs. A summary of the results obtained is presented in Table 1.

On referring to Table 1 it will be noted that the mortality of the experimental birds varied considerably with the different pens. The maximum mortality, twelve birds, was for Pen 2. Excepting Pen 2 the mortality of nine for the controls exceeded that of any of the pens which were fed cod liver oil. The body weight per bird at the end of the eight months test is of interest. Ordinarily birds producing a large number of eggs for a long period of time show a greater loss of body weight than similar birds with a low egg production. In this instance however the body weight of the birds which produced the most eggs, i. e., those which received cod liver oil, was essentially the same as that of the control birds. In fact the birds that received cod liver oil were very slightly heavier than the controls at the end of the experimental period. No significant conclusions can be drawn from the data obtained relative to the number of birds which were broody during the experimental period.

The egg production was least, 38.3%, for the controls and highest, 56.6%, for the birds receiving the most oil. It perhaps may be noted here that the returns for eggs produced by Pen 5 was \$125.00 greater than for the eggs produced by Pen 1. The number of eggs containing blood spots (probably resulting from hemorrhages in the reproductive organs) was greatest, 4.4%, for the controls and least, 2.0%, for the Pens 4 and 5. Since eggs containing blood spots are not salable the loss on account of blood spots was more than twice as large for the controls as for the birds receiving the larger amounts of cod liver oil. It is not felt that the weight

TABLE 1
Results of Feeding Cod Liver Oil to Laying Pullets

	Pen 1	Pen 2	Pen 3	Pen 4	Pen 5
<i>Pullet Record:</i>					
Mortality	9	12	5	3	2
Body weight at end of experiment, lbs.....	6.2	6.3	6.2	6.4	6.5
Number of broody birds.....	105	84	77	105	78
<i>Egg Record:</i>					
Production, per cent.....	38.3	47.0	51.2	49.2	56.6
Blood spots, per cent.....	4.4	3.2	2.6	2.0	2.0
Weight of eggs, gms.....	57.1	58.6	57.9	58.8	58.0
Fertility, per cent	94.6	94.1	95.1	95.3	96.2
Hatchability, per cent.....	53.9	63.6	63.3	68.8	72.1
<i>Chick Record:</i>					
Viability of chicks, per cent.....	42.0	77.0	92.0	85.0	91.0

of the eggs was significantly influenced by the administration of cod liver oil. The hatchability of the eggs varied from 53.9% for the controls to 72.1% for Pen 5. In other words from each hundred eggs which were placed in the incubator the eggs from Pen 5 produced eighteen chicks more than the eggs from Pen 1. The values reported in Table 1 for the viability of chicks were obtained by placing recently hatched chicks from each of the five pens in each of five colony brooding houses. During the first night that the chicks were in the brooder houses the temperature fell to 40° F. and coincidentally the caretaker contracted influenza and was removed to the hospital. While these conditions were not anticipated they served to yield data as to the relative capacity of the chicks to withstand adversity. It is quite evident from the per cent of chicks which grew that those chicks produced by birds receiving cod liver oil as a supplementary source of fat-soluble vitamins possessed greater vitality than those from birds which received no cod liver oil. Since the mortality of the birds that received the larger amounts of cod liver oil was lower, the egg production was higher, the loss of eggs with blood spots was less, the hatchability of their eggs was higher, and the viability of chicks from their eggs was higher than that of the control birds it is quite evident that the addition of vitamin rich cod liver oil to the ration increased the reproductive performance of the experimental birds.

Definite information is not available as to the extent to which results of experiments with the domestic fowl can be applied to human beings. If the above noted results are applicable to human reproduction they indicate quite definitely that women who receive an adequate diet, particularly as regards vitamins, during pregnancy and lactation are less likely to suffer illhealth and complications during these periods and are likely to produce chil-

dren with better life expectancy than women whose diet during pregnancy and lactation is more or less inadequate with respect to vitamins.

Much attention has been given to the value of school lunches for improving the dietary of underpar school children. Frequently the school lunches are selected with a view to enhancing the energy and protein value of the dietary. Obviously, it is important to consider the value of supplementing the dietary with vitamins, particularly as numerous investigators^{1-3, 5-9, 15-16, 19-23, 25-27}, have accumulated data indicating that the lack of vitamin A tends to predispose laboratory animals to nasal, sinus, or upper respiratory tract infections. Accordingly it seemed of interest to investigate¹² the value of feeding vitamin A-rich cod liver oil to school children considered as tuberculosis suspects, i. e., contact cases, arrested cases, more or less active tuberculosis cases and underpar children who were running daily temperatures. Three-quarters of an ounce of cod liver oil per week was fed at the lunch periods. The experimental period was of twenty-six weeks' duration. The medical examination at the beginning and end of the experimental period produced data for each subject regarding heart, lungs, eyes, ears, nose, throat, teeth, previous illness and family history. The average gain in weight for the twenty-eight children under observation was 6.7 lbs., whereas the computed average gain in weight for normal children of the same aged would have been 3.25 pounds. Thus the children reduced their "underweight" 3.5 pounds during the period of the experiment. Thirty per cent of the children had temperatures of 100° or more at the beginning of the test. During the progress of the study twenty-five subjects showed a reduction in their abnormal body temperature. Table 2 contains detailed data for each subject concerning gain in body weight, concerning the number of days' absence and scholastic

TABLE 2
Results of Feeding Cod Liver Oil to Under-Par School Children

Subject No.	Gain in Weight, Lbs.	Days' Absence		COMMENTS
		Last Year	This Year	
1.....	3.0	11	None	Passed grade last 2 years
2.....	5.5	13	½	Failed last year, passed this year
3.....	3.5	21	4	Passed last year, failed this year
4.....	6.0	28	18	Passed last 2 years
5.....	6.0	18	6	Failed last year, passed this year
6.....	9.0	16	None	Failed last year, passed this year
7.....	5.5	41	21½	Passed grade last 2 years
8.....	6.0	..	1st 3 mo.	Passed grade
9.....	6.0	5	None	Passed grade last 2 years
10.....	9.0	33	16	Failed last year, passed this year
11.....	4.5	16	None	Passed last 3 years
12.....	5.3	33	22½	Failed last year, passed this year
13.....	5.5	14	None	Passed last 2 years
14.....	4.8	10	5	Failed last year, passed this year
15.....	6.5	4	None	Passed last 3 years
16.....	12.5	68	29½	Failed last year, passed this year
17.....	8.3	None	9	Passed last 3 years
18.....	9.5	6	None	Passed last 3 years
19.....	9.5	9	None	Passed last 3 years
20.....	4.5	19	None	Passed last 3 years
21.....	5.0	Passed grade
22.....	8.0	30	½	Passed last 3 years
23.....	7.5	1	None	Passed grade
24.....	8.5	12	None	Passed last 3 years
25.....	9.3	T.B.	None	Failed last 2 years, passed this year. Health better now than in September
		San. Over 1 Year		
26.....	4.0	8	None	Passed last 2 years
27.....	11.5	27	10	Failed last 2 years
28.....	6.0	16	8	Passed last 3 years
Average.....	6.7	
*Total.....		459	150½	

*Subjects Nos. 8, 21 and 25 are excluded in computing the total.

accomplishment during the experimental period and during a corresponding period the previous year. The influence of administration of cod liver oil on the absences is of particular interest. It will be noted that during the year previous to the test the subjects were absent 459 days while during the experimental period the same subjects were absent only 150 days or one-third as much. From these data it is concluded that the administration of cod liver oil to underpar school children with tuberculosis tendencies serves to increase their body weight, reduce somewhat their elevated temperatures, materially decrease the number of absences due to colds and similar troubles and to improve somewhat their capacity for school work.

The U. S. Public Health Service^{4, 24}, The Metropolitan Life Insurance Company¹⁷, The Edison Electric Illuminating Company⁴, and other organizations and investigators have given much attention to the cause of absence of industrial workers from their usual activities. The significance of this economic waste is emphasized by Mills¹⁸ when he states that wage earners in the United States are absent from their work on account of illness at least 250,000,000 working days per year. In a study¹⁸ conducted to determine the possibility of reducing lost time of wage earners caused by colds and similar troubles one tablespoonful of a vitamin rich cod liver oil was administered at the morning or afternoon rest period to a group of 185 persons (115 women and 70 men). The control group of 128 persons consisted of 88 women and 40 men. The members of each group were so selected that different types of occupation were represented, i.e., 34% of the subjects were engaged in office work, 27.6% at light machine work and 38.4% at heavier machine work. It was estimated that the average daily energy expenditure for the women subjects was 2,100 calories for the office workers, 2,400 calories for the light machine workers and 2,800 calories for the heavier machine workers, and the average daily energy expenditure for men was 2,540 calories for the office workers, 2,865 calories for the light machine workers and 3,356 calories for the heavier machine workers. A record was made of the colds which developed during the twenty weeks' experimental period. It was found that 44.9% of the cod liver oil group developed colds as compared with 67.2% of the controls. Considered from another angle it was found that 48.1% of the subjects of the cod liver oil group lost time during the experimental period as compared with 59.4% of the subjects of the control group were absent from work. Considering the absence records on an average hourly basis it was found that the subjects of the cod liver oil group were absent 12.8 hours during the experimental period and the subjects of the control group were absent 25.1 hours. From these data it would appear that feeding vitamin rich cod

liver oil as a supplement to the home dietary materially reduced the economic loss to employer and employe occasioned by "lost time" due to colds and similar infections.

A recent study¹⁴ was conducted to determine the influence of the body weight and the administration of cod liver oil on industrial absenteeism. Men and women, typical of industrial employes, who were employed at a variety of tasks were selected as subjects. They were classified according to their body weight. Group 1 consisted of men and women more than 7% below ideal weight for their age and height, Group 2 consisted of those between 0.1-6.9% below ideal weight, Group 3 consisted of those between ideal weight and 6.9% above and Group 4 consisted of those exceeding 7% above ideal weight. The groups were divided, approximately one-half of each group received cod liver oil and the remainder served as controls. The cod liver oil group were given five tablespoonfuls of a vitamin rich cod liver oil per week at either morning or afternoon rest period. A record was made of all absences which occurred in both groups. However, absences caused by accidents and surgical operations were eliminated. The absences of each of the eight groups during three consecutive years have been reduced to a percentage basis and are reported in Table 3.

On inspection of these data it will be observed that the amount of absence for the combined cod liver oil and control subjects within 7% of ideal weight was somewhat less than that of the subjects who were more than 7% above or below ideal weight. The amount of absence for the cod liver oil subjects of Group 2 was greater during the years 1930-31 and 1931-32 than that of the comparable control subjects. In the other ten comparisons of the amount of absence of the cod liver oil subjects and the control subjects for the different weight groups during the three consecutive years, the amount of absence for the cod liver oil subjects was significantly less than that of corresponding control subjects. The amount of absence of all subjects receiving cod liver oil for the three consecutive years was 1.1% of the total possible working hours, whereas the absence for all of the control subjects during the same periods was 3.1% of the total possible working hours. The total absence for the control group was 24,580 hours. If these subjects had reacted to the administration of cod liver oil in the same manner as those which received cod liver oil (1.10% absence) the amount of their absence would have been 8,721 hours. The difference, 15,861 hours of lost time, when considered on a 40-hour week and a \$20 wage scale amounts to \$7,930.

The results obtained in the four investigations discussed above indicate quite conclusively that the administration of cod liver oil as a supplement to the home

TABLE 3
The Influence of the Administration of Cod Liver Oil on Industrial Absenteeism

	1930-31		1931-32		1932-33	
	Cod Liver Oil Subjects %	Control Subjects %	Cod Liver Oil Subjects %	Control Subjects %	Cod Liver Oil Subjects %	Control Subjects %
Subjects 7% or more below ideal weight.....	2.30	3.81	2.81	3.81	1.91	2.27
Subjects 0.1-6.9% below ideal weight.....	3.66	2.90	2.37	1.91	1.41	1.86
Subjects 0.0-6.9% above ideal weight.....	0.95	4.45	0.99	4.01	1.35	1.86
Subjects 7% or more above ideal weight.....	1.81	3.43	1.26	4.74	1.29	2.37
Average all subjects.....	2.18	3.65	1.86	3.61	1.49	2.09

*Absence of cod liver oil subjects for three winters, 1.10%.
Absence of control oil subjects for three winters, 3.10%.

*Weighted average.

results which are instrumental in bringing the averages to such high figures. The manufacturer who is not availing himself of the knowledge of refining methods which has been developed by the American Oil Chemists' Society has certainly placed himself in the position of a marginal producer who cannot find a profit in his operations, particularly in these days of over-production and keen competition for business. Each refinery control chemist, on the other hand, should inspect his operating statements to determine whether his results are superior to those indicated by the Bureau of the Census for the country as a whole, and if he finds them inadequate, should make an effort to rectify such inefficiencies as may exist in his plant operations in order to at least equal the results which he obtains in the laboratory.

New York, N. Y., May 8, 1933.

Grenada (B.W.I.)—Schedule of Export Duties Revised

An order in council, approved on November 15, 1933, and effective from January 1, 1934, imposes an export duty on copra and alters the existing rates on cocoa, cotton, cottonseed, nutmegs, mace, lime oil, and lime juice exported from Grenada, according to an announcement in the Government Gazette, St. Georges, December 1. The new export duties (per hundredweight or fraction thereof, unless otherwise stated) are as follows:

Copra 3d., cocoa 6d., cotton 1s., cottonseed 3d., nutmegs 6d., mace 1s., lime oil 6d. per pound, concentrated lime juice 1s. per 100 gallons and raw lime juice 3d. per 100 gallons.



POET'S CORNER

Jolly St. Nick was sorrowful,
Midst all the Christmas joys,
For a passing truck with mud
Had spattered all his toys.

Suddenly it thundered,
Black clouds o'erspread the sky,
Whilst a very rain of black
Descended from on high.

Brave Nick remained undaunted.
In fact, he winked his eye.
"We're saved," he cried, "'tis Nuchar,
And each toy 'twill purify."

L'ENVOI

When odors and colors bother you,
Don't fume or fret or flurry,
Like Nick, let Nuchar make an end
Of every business worry.

The Century of Progress that
John Public has been gazing at
Has shown him all that Science knows
Of everything and how it goes,
From why and how of chromosomes
Condensed from many bulky tomes,
To the explanatory dope
On the amazing stroboscope.
Now Science has a job to do
In working up some stunts quite new,
So scientists will know more than
Is known to every common man.
We hope that this new effort brings
Some genuinely helpful things
Like bridge decks that will always win,
Foods you can eat and still stay thin,
A golf ball that, without a flaw,
Obeys man's will, not nature's law;
Even a dollar that expands
To meet increasing tax demands.

And may our New Year wish come true
That Science will produce for you
Whatever bit of useful lore
You need for Nineteen Thirty-Four.

Carl S. Miner—Otto C. Stanger.

You may be dark as any wench,
Or black as any crow,
But Nuchar bought from Joseph Wrench
Will make you white as snow.

And then it's just the thing to get
To quench the foulest stench,
A polecat can be made a pet
By Nuchar bought from Wrench.

L'Envoi
For every stench, see Wrench.
Anonymous.

I have your Song of Santa Claus
The Saint to children dear,
And this tale about the Nuchar Snow
To me is very clear.

I once lived in Chicago
Your city by the lake,
But we did not then have Nuchar
The Stock Yards smells to take.

The snow was oft the color
As stated in your rhyme,
It made us wish for Nuchar
To take away the grime.
David Wesson.

